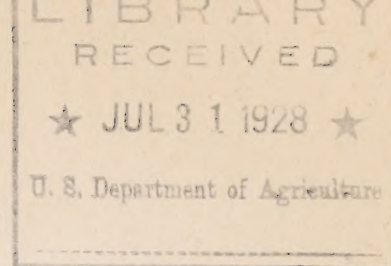


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BRANCH OF RESEARCH

JUNE, 1928

CONTENTS

	<u>Page</u>
Foreword.	1
Forest Experiment Stations	
Washington Office.	2
Northeastern	3
Central States	4
Appalachian.	6
Allegheny.	8
Southern	10
California	12
Rocky Mountain	16
Northern Rocky Mt.	18
Pacific Northwest.	20
Forest Products	
Washington Office.	23
District 1	25
District 6	26
Forest Economics	
Washington Office.	28
Forest Taxation Inquiry.	30
Range Research	
Washington Office.	31
Forage Investigations.	31
Great Basin Experiment Station	32
District 6.	34
Jornada.	35
Santa Rita	36

A RESEARCH VIEWPOINT

R. S. Campbell
Jornada Range Reserve

The trials of the young research worker are many. Often times receiving little or no credit for important contributions; being curbed by advanced men from overzealous efforts on side lines which, though important, throw little light on the fundamental problems under investigation; and discouraged by slow progress in accomplishment, by data which seemingly has no interpretation, and by delays in publication, how difficult is the path of the novice in research! Yet, how much more difficult is the work of the seasoned veteran, who must supervise the work of the less experienced men. He must have patience with the often times feeble or misdirected efforts of his junior associates, but still grant full credit for deserving results, ever with a word of suggestion or of encouragement for the struggling beginner.

One situation which must always be guarded is that of friction between workers; of petty jealousies caused by misunderstanding, overworked men or uncongenial temperaments. If anything should seal the bond of friendship, produce the open mind and the affectionate heart, it should be the investigation of related problems by different workers. But the human factor can not be escaped, the field of research has produced some of the bitterest enemies ever known.

The Branch of Research might be regarded as a great school, with the older men serving as faculty members, and the inexperienced men as students. With this concept in mind can we not work toward the ideal so well expressed by Max Mason, President of the University of Chicago? He views the work of that school as follows: " - - - emphasizing the fact that education is fundamentally self-education, and that the University may well be defined as a set of personalities, capable of inspiring curiosity in students, together with physical facilities which enable students to satisfy their own curiosity by their own effort. - - - The ideal toward which it is desirable to work is that of a group of problem-solvers, united in a real fellowship of learning - a group comprised of both Faculty and students participating in the solution of problems as their abilities allow, the students inspired to obtain knowledge because of their interest in the application of knowledge and technique which they see around them."

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(Over)

Washington

The Branch of Research was rather deserted during June. Messrs. Clapp, Marsh and Betts attended the program conference of the Forest Products Laboratory, which was attended also by Kotok of the California Station. Before Marsh returns he will visit Districts 1, 6 and 5, and the three stations concerned. Munns spent most of the month with Frothingham in the Appalachian Station territory. The latter part of the month, the Misses Simonson left for a trip to England, and there were a number of other vacationists in the Branch. Chapline took over the work of the office.

Perkins Coville arrived on the job the latter part of June and began to take an active part in the work of the Office of Forest Experiment Stations. Besides assisting in handling work here, Coville will head up the work in heredity and genetics. He plans first to wind up a number of things left in an unfinished state by Sudworth.

Victor Clements, Junior Forester from the California Station, was transferred to Washington the middle of June to work in the Forest Measurements Section. On his way east he is to spend some time at the Southwestern Station. He will take the place left vacant by the transfer of E. R. Martell.

Director Kotok of the California Station visited Washington for a few weeks following the Program Conference of the Forest Products Laboratory, spending his time with the Editor in revising his manuscript on "Cover Type and Fire Control."

Ted Haig also spent some time in Washington in the Section of Forest Measurements, cleaning up some odds and ends in connection with the western white pine yield study. Haig has completed this year his work at Yale and is now returning to the Experiment Station.

Doctorates

Our famous and well-known Boss was justly honored by his Alma Mater, the University of Michigan, by the honorary degree of Doctor of Science. The citation read at the time of conferring the degree is as follows: "Earle Hart Clapp, graduate of the College of Literature, Science, and the Arts in the class of 1905, engaged continuously since then in the United States Forest Service, and since 1915 in charge of the Branch of Research. Under his leadership as a skilled investigator and administrator work in widely diversified fields has been coordinated, regional experiment stations established, and research in the fundamental problems of forestry developed into a major activity of the services. With a clear vision of the importance of forestry in the economic life of the nation, and the character and ability to transmute dream and vision into reality, he has achieved memorable distinction in promoting the public good."

Another doctor in the organization this year is F. W. Haasis, who received his Ph. D. degree from John Hopkins in Plant Physiology. Dr. Haasis's work was upon the "Influence of Temperature upon the Germination of Jack Pine and Rice Seed." Haasis returned to the Station about the middle of June.

Mississippi Flood

The President has called upon the Forest Service for data upon the extent and manner in which the forests affect the floods of the Mississippi River. A copy of Mr. Sherman's mimeographed report has been forwarded to the President, together with the statement that the Service would undertake immediately the collection of additional data to complete the request. It is proposed that the Regional reports prepared by various individuals for sections of the Mississippi River drainage will be put in shape for publication and that an additional statement will be prepared, bringing up to date the information on the influence of forests upon streamflow and erosion. This request of the President's is going to throw considerable additional work upon the station organization for the summer.

Library

In June there were 779 books and periodicals borrowed from the library, and 105 members of the Service and others consulted the library in person.

During the month 299 books and periodical articles were indexed for the catalogue.

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NORTHEASTERN FOREST EXPERIMENT STATION

Boyce spent the first part of the month in the field getting acquainted with his new territory. He helped Stickel in the establishment of the fire weather station at Smyrna Mills, Maine, which was put up between rain storms. If high relative humidity discourages fires, they have certainly had a hard season in New England so far. Joseph Truncer, a junior in the New York State College of Forestry, is the observer at the Smyrna Mills fire weather station.

Boyce also spent a little time with MacAloney and Hall in the White Mountain National Forest, where they were studying the work of the bronze birch borer, particularly on paper birch. Any feasible control of this insect will probably have to be brought about by silvicultural practice.

Westveld is continuing his studies on spruce and balsam fir reproduction in the White Mountains, and has been carrying on some seed bed condition studies by sowing seed in different types of soil, and then studying the germination and subsequent survival of the seedlings. It was rather noticeable that where seedlings came up in spots where the soil had been mineralized and blackened by fire they rather quickly died, no doubt as a result of the well-known heat injury so injurious to seedlings in nurseries. The temperature of the blackened soil must be several degrees higher than normal.

Wheaton, with Donald Curtis from Pennsylvania State College as field assistant, has been engaged in the establishment of permanent sample plots in the vicinity of the Gale River sub-station for practically the entire month.

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CENTRAL STATES FOREST EXPERIMENT STATION

General

Field work carried on by the Station was accelerated during the month by the arrival of three temporary field assistants. R. K. Winters was assigned to assist Day in Virginia in the study of second growth stands of hardwood. H. F. Morey who worked with this Station last year was assigned to the study of grazing in relation to farm woodlands to assist Meyer. R. B. Gordon joined Kellogg in the study of the older plantations.

Working plans which had been prepared for the woodlot grazing and plantation studies were forwarded to Washington.

TS-12 Oak Study

Hanley's party completed the examination of second growth stands in southeastern Ohio and spent about a week south of Greenup, Kentucky, in the measurement of cut timber for volume tables. Late in the month they returned by way of Columbus and went into the northern part of Illinois to examine some second growth stands which had resulted from the early cutting of timber along the prairie margins.

In the early period of settlement of northern Illinois the settlers sought the timbered lands in the belief that these were better agricultural lands than the adjoining prairies. Due to a lack of other sources

Note.----The crooked lines on pages 4 and 5 were caused by the typewriter being out of order.

of timber supplies, tracts of forest along the streamways were in many cases completely cut away. Later, the discovery that the prairie land was suitable for farming purposes and the construction of railroads which brought the timber of the Lake States within reach, caused a cessation of local cutting. This forest has since grown up into approximately even-aged stands. Some of these have proven to be suitable for yield studies although many of them show a slight uneven-aged condition where some of the smaller trees were left at the time of the first cutting.

Day began this month his work in the Shenandoah Valley region of Virginia. He is here working on areas which were previously examined in connection with the oak study. The purpose in going over this territory again is to secure yield records on stands less than 75% oak.

Fp-1 Plantation Study

Kellogg and Gordon began the study of the older plantations of the Ohio-Mississippi Valley region in Indiana. Lists of known plantations were obtained through the cooperation of the State Forester's office and these are being augmented by consultation with County Farm Bureau agents and by field exploration. This party is obtaining complete yield figures on the older plantations with the expectation that yield tables will be prepared for those species which have a large enough representation of plantations. The party is also obtaining records of the history of these plantations in an endeavor to determine the conditions which will have given the best results in planting practice. The work during this month was extended into southern Indiana.

T-1 Type Study

The Station plans to prepare a classification of types for its territory with the assistance of other agencies in the region. A trip of eight days was made into West Virginia in company with Drs. Transeau and Sampson of the Ohio State University. These men have been engaged in the study of forest succession in Ohio for several years and the trip to West Virginia was designed to correlate the study of types for this region with that conducted by the Southern Appalachian section of the Society of American Foresters for the Appalachian region. A visit was made to the spruce type and the examination of forest types continued from there down through the high plateau of central West Virginia to the types found in the lower Kanawha Valley. One day was spent in a trip to the lower watershed of the Big Sandy River and two days in the second growth forests of southern Ohio.

Type classification for the Ohio Valley must be based largely on associations which have resulted from variations in soil and atmospheric conditions. With the exception of the spruce-fir forest which occurs at the highest elevations in the Appalachians, practically all of the

forest types represented in the Appalachian Mountains with some other variations will be found from Ohio and Kentucky westward. Changes in moisture conditions due to drainage of the land and removal of the continuous forest cover of this region, has resulted in changes of the forest types. In many instances timber types which are suited to drier climatic conditions have replaced those demanding greater moisture. The work of Drs. Transeau and Sampson will aid the Station materially in correct interpretation of these conditions.

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APPALACHIAN FOREST EXPERIMENT STATION

General

Station headquarters were moved June 11-13 to the sixth floor of of the new Asheville City Hall, where seven rooms have been leased. These are much larger than the six previously occupied in the Medical Building, giving a floor space of 3,277 square feet as compared with 990 in the old quarters. On the same floor are the offices of the Pisgah National Forest, the district forester of the State Forest Service, the North Carolina Park Commission, and the Geological Survey. This concentration of forestry and related activities is a great improvement over past conditions.

Frothingham joined Munns at Washington on the 4th, and the two made a two weeks' trip through West Virginia and Kentucky. At Charleston, W. Va., they met State forest fire warden P. M. Browning and State extension forester T. W. Skuce, and discussed plans and outlook for investigative work in West Virginia. They next visited Thomas H. Clagett, of the Pocahontas Coal Company, at Bluefield, the State forest nursery on the Seneca State Forest, near Marlinton, and the Forest Service nursery which was being established near Parsons, W. Va. At Parsons they met Supervisor Perkins, L. S. Gross, and other District 7 officers.

In Kentucky they visited the Robinson sub-station of the Kentucky Agricultural Station, at Quicksand, and made a trip to the Robinson forest tract, about 18 miles from Quicksand. This tract of about 15,000 acres was presented to the State several years ago, after being logged, for experimental and demonstration purposes. The tract is being cruised and mapped by C. H. Burrage, who has also started some weeding experiments in hardwood reproduction and planting tests of a number of coniferous species. At the points visited on this tract excellent reproduction was observed on all but the dry, rocky sites. The principal handicap seemed to be a large amount of timber, largely beech, left standing as unmerchantable. This will interfere with the development and value of the second-growth, which would otherwise occupy the ground. A road now under construction through Breathitt County will open up a market for some of this material for mine props and other purposes.

Tentative plans were made for the mapping and sub-division of the Berea College forest, where the Appalachian Station began work in 1923, and a map showing boundaries and roads was furnished for copying. Plans were also made for the establishment of additional permanent sample plots this summer in the methods of cutting study.

Munns spent about a week in Asheville, going over the work of the Station with various members of the staff. Trips were made to the Bent Creek experimental forest and to Stony Fork, on Pisgah National Forest, to inspect past work and proposed sites for permanent plots. R. M. Evans and J. A. Fitzwater, of the Washington Office, were present on the Bent Creek trip.

F. W. Haasis and I. H. Sims rejoined the staff from Johns Hopkins University and the University of Michigan respectively. As a result of his two years post-graduate work, Haasis received the degree of Ph.D. His dissertation was entitled "Some Relations of Temperature and Length of Germination Period to the Percentage of Germination of Seeds, Especially of Pitch Pine and Rice." Sims was given his Masters degree, in forestry.

Charles A. Abell, Junior Forester, is the latest addition to the Station's permanent staff. Mr. Abell graduated in forestry at Cornell. He will be assigned to Dr. Hursh's party for the study of physical properties of soils, particularly as affected by fire.

A. B. Hatch, a graduate of the Idaho School of Forestry, reported for this summer's work with the Station. Mr. Hatch intends to continue his forestry studies at Yale next fall.

Through the Scandinavian-American foundation, the Station has secured the services of Tage Blidberg, who reported in June for work during the summer.

Methods of Cutting: Hardwoods

In connection with the mill-scale study at Stony Fork, Pisgah National Forest, Buell selected sites for permanent plots. Haasis, assisted by Hatch and Moser, then put in a week's work on these plots, but discontinued pending the removal of chestnut acid wood from the cutover plot. This pair of plots should be of particular interest on account of the unusually large amount of basswood, which is not very abundant in most parts of the Southern Appalachian region. The other leading species are chestnut, red oak, sugar maple, red maple, sweet birch, and yellow birch. In addition to their use for the methods of cutting study these plots will also serve for the study of the natural replacement of blight-killed chestnut.

Two half-acre plots for the methods of cutting project were located by Korstian and MacKinney on the cordwood cutting area near the point of Shut-in-Ridge on the Bent Creek experimental forest.

Mill-scale Study

The mill-scale study party spent the month of June in camp on Stony Fork, Pisgah National Forest. The party is under the general direction of R. D. Garver, for the Madison Forest Products Laboratory, with District 7 of the Forest Service, the Bureau of Entomology, the Bureau of Pathology, and the Appalachian Station, cooperating in the work.

The party is timing the operations of felling and bucking trees, hauling logs to the mill, and sawing them into lumber. It has been possible to number the logs as the trees were felled and follow them through the mill and until the lumber from them was graded.

R. A. St. George of the Bureau of Entomology and Dr. G. G. Hedgecock of the Bureau of Plant Industry, are making studies of insect and fungus defects in the logs and lumber that are sawed. Mr. St. George returned to the party after a week in Washington spent in preparing forms for the notes on insect damage.

Forest Entomology

It has been proved beyond doubt that pines which have been burned are especially attractive to the southern pine beetle. The beetles are able, under endemic conditions, to maintain themselves and carry on their activities in trees weakened by fire. This is another good argument against woods-burning in the Southeast.

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ALLEGHENY FOREST EXPERIMENT STATION

General

One of the outstanding events was our occupancy of our permanent headquarters building at 3437 Woodland Avenue. The University has very generously placed at our disposal this eight-room, three-story building across the street from the administration building and library. At present the three rooms on the first floor will house the clerical and computing staff and the library; the second floor, the Director and four members of the permanent technical staff; and the third floor, the other members of the permanent staff and a small laboratory. The building has been put in good repair by the University. Altogether, we now have very comfortable quarters, with room for future expansion.

The three-room cabin on the headquarters forest tract at Camp Ockanickon was completed. It furnishes convenient housing and an opportunity for office work during inclement weather.

With the arrival of Associate Silviculturist H. J. Lutz, the permanent technical staff reached its quota. Mr. Lutz has had experience in the administrative work in District 2 and Alaska, and for the past two years has been at Yale and the Connecticut Agricultural Experiment Station where he has given particular attention to work on forest soils. Hugo L. Sundling was reinstated in the Forest Service, as Assistant Silviculturist.

Forbes, as a member of the Committee on the Annual Meeting of the S. A. F., attended a meeting in New York at which some innovations were discussed for the annual meeting of the Society in that city this winter. Later he spent a few days in West Virginia with Director McCarthy of the Central States Station, and Doctors E. N. Transeau and Sampson of Ohio State. They visited and examined a number of fine virgin and second growth stands, including one 70-acre tract of nearly virgin spruce and hemlock on Government land east of Elkins. The chief object of this trip was to study forest types, many of which the Allegheny Station shares with the Appalachian.

Forbes went direct from West Virginia to Warren, Pa., to begin the extensive surveys in this region, and incidentally to check over the methods-of-cutting plots on the Allegheny Forest. Dr. L. G. Rommell of Cornell met Forbes at Warren and discussed the possibilities of cooperation between the Station and Cornell University in the study of the virgin hemlock-white pine forest at Heart's Content. E. C. Filler and L. W. Hodgson, of the Boston office of Blister Rust Control, also visited the Heart's Content area to discuss and inspect the rust situation. No disease was found on the tract at this time, but conditions are such that its advent in time must certainly be counted upon.

Mr. L. L. Lee of the New Jersey Agricultural Experiment Station completed his soil survey of the Ockanickon area. The soils map will soon be available.

Management

The crown map and stem map for the Little Arnot Management plots were finished and tree measurements on the clear-cut plot were completed. The establishing and charting of reproduction quadrats was continued. Even this has left the job on Little Arnot far from completed. We learned that there are still a number of virgin forest areas on the Allegheny Forest.

Measurement

The addition of a clear-cut fourth plot to the series on Little Arnot Creek has given us a splendid opportunity to obtain badly needed volume table measurements on second-growth black cherry of a good range of diameters (but not of height).

SOUTHERN FOREST EXPERIMENT STATION

General

The most important event of the month, from the standpoint of the staff as a whole, was the reinstatement of Dr. L. J. Pessin after an absence of nearly a year at the Texas Agricultural Experiment Station.

Assistant State Forester Canterbury of Louisiana conferred with the station as to the profits to be expected from planting denuded land near Alexandria, Louisiana. The information was requested by a creosoting company which may, if the returns appear promising enough, purchase a considerable area and plant it to the more evidently desirable species. The results showed the superiority of a 45-year rotation over a 30-year for either pulp wood or timber production. The effect of the varying length of rotation on the products desired by the creosoting company could not, of course, be told with very much certainty. The practical example furnished an excellent means of checking the usefulness of our growth studies and our planting cost data.

During the month Wakeley brought the number of Station photographs indexed according to the general classification of forestry up to approximately 600.

Visitors at headquarters during the month included Dr. F. T. Thomas, State Entomologist of Texas, and Dr. Ivar Tragardh of the Swedish Forest Experiment Station. Dr. and Mrs. Tragardh visited the Starke branch, where they spent a day or two studying the insect fauna of the leaf litter and duff.

On June 20 there was a meeting of naval stores men at Starke, attended by about 65 operators. The Central Florida Turpentine Producers Association and the Suwannee River Turpentine Producers Association were represented as well as independent operators. After a meeting in the Court House, the visitors inspected the Kingsley tract.

Measurements

Barrett worked upon the accelerated growth study of longleaf pine, applying Bruce and Reincke's manuscript on curvilinear multiple correlation to the figures obtained from the released trees at Urania. From these figures he prepared a longleaf taper table, in answer to a request from the Southern Creosoting Company for information bearing on their specifications for poles.

Management

At McNeill, Mississippi, Wahlenberg and Hills counted 221 cones of the 1927 crop on a longleaf sapling 21 years old.

Some of the 1924 longleaf seedlings have dropped out, and there is a poor crop of 1927 longleaf seedlings, but quite a number of short-leaf seedlings are coming in from the 1927 crop.

Naval Stores

June was featured by routine field work. The regular streaks were put on, and the second dip made on the Kingsley and Union tracts. Duke's and Sampson were dipped for the third time. Duke's, in particular, is showing up remarkably well, the third dip running at the rate of about 57 barrels to the crop. The French faces at Kingsley showed some advantage over the American faces on the same trees in the second dip. The split face group continues to run very well. The trees which were fertilized fell down in yield in relation to the check unfertilized group. The outstanding change in relationships, however, came in the width of streaks test at Kingsley. Here the first two dippings gave an average of 5 per cent in favor of the narrow streaks, as contrasted with a yield of only 81 per cent as much as the wide streaks in 1926 and 79 per cent in 1927. This is in accord with the findings which we had in the old groups which were started in 1923.

Forestation

Wakeley checked over the study made by Professor Hayes in the commercial plantations of the Great Southern Lumber Company during the summer of 1926 and conferred with Professor Hayes at Bogalusa concerning the preparation of this material for publication in bulletin form next winter, by Louisiana State University.

The June germination tests of longleaf seed stored since last fall in an unsealed metal can showed a startling decrease in germination per cent as compared with smaller samples tested in May and in preceding months. The June per cent was approximately 20, as compared with 60-70 and better in previous months.

Weed control by use of either zinc sulphate, zinc sulphate and formaldehyde, or paper mulch is giving less satisfaction in the long-leaf nursery at Bogalusa than is control by drill sowing, frequent rapid hoeing, and occasional hand weeding, as practiced by the Great Southern Lumber Company. The present practice of the company was developed by Head Ranger Red Batemen, who evolved a method of drill sowing

longleaf with the wings on despite our earnest assurance that it could not be done. The zinc sulphate treatment (six grams per square foot) would be more effective than Batemen's method except for a variety of grasses, which are fully as resistant to the chemical as are the longleaf seedlings.

At Camp Pinchot Gemmer and Pessin made mortality counts in the longleaf pine plantation. The seedlings planted under piled brush have survived fairly well, noticeably better than the seedlings planted in the open, even on plowed areas fairly free of root competition.

Protection, Others

Hills collected insect-infested new growth and first year cones of longleaf at McNeill the last of May, and samples of this material were sent to Washington for identification. The Bureau of Entomology identified the larvae in the new growth as belonging to the genus Dioryctria, and a moth which emerged from some of the material in New Orleans on June 12 proved to be Dioryctria amatella Hulst. This same species was obtained from mature cones last fall. There are indications that moths of this genus are sometimes responsible for serious diminution of the supply of southern pine seed.

On a trip to Bogalusa the last week in June, Wakeley found that the second brood (prospective third flight) of pine tip moth had reached the pupal stage.

On the brown spot control plots at Bogalusa, Bordeaux mixture is giving practically perfect control of brown spot of longleaf caused by Cryptosporium acicolum, and the results obtained by lime sulphur are almost as good. The Great Southern Lumber Company is spraying almost the entire longleaf nursery with Bordeaux to prevent an attack such as that which defoliated their longleaf planting stock in the nursery late in 1926.

At Camp Pinchot, less brown spot was apparent on the unburned areas than on the burned, an observation quite contrary to that made by some other members of the Forest Service.

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CALIFORNIA FOREST EXPERIMENT STATION

Director Kotok and Cary Hill left Berkeley on May 31 to attend the Products Research Conference at Madison. Their plans called for some extension of their trip which will keep them in the East until July 1.

Management

Siggins, Hormay and Wright have spent most of the month remeasuring the eight methods of cutting plots at Massack on the Plumas. This measurement completes the third five-year period for these plots. Growth continues to be slow because of the heavy stand left, and deficient rainfall. The slow growth is particularly noticeable in reproduction which shows little release in comparison to that on adjoining heavily-cut private land. Damage to reproduction by sheep is evident again this spring. Dunning helped Siggins get started on the Plumas and then returned to the Stanislaus to complete measurements on the old sample plots there. The plot being recut was resurveyed, remeasured and marked for cutting. The logging plan was gone over with Hook, who is in charge of the sale, and officials of the lumber company, to insure as little damage as possible. A heavy cutting is to be made to release reproduction now well established. A new plot is being selected in the sugar pine-fir type in advance of cutting.

Southern California

Kraebel returned to Berkeley on June 9 from a seven-weeks sojourn in the south during which he made trips to the Cleveland, Angeles and Santa Barbara Forests as well as spending considerable time at the Devil Canyon Branch.

At Devil Canyon Nursery the month was marked by the battle with the weeds which are so abundant that extra help was required for a few days to give the transplant areas one rapid cleaning and so enable our single laborer to keep pace with the new growth. The nursery site is an abandoned ranch overgrown apparently with every species of weed in California. Flocks of seed-eating and seedling-eating birds have compelled the screening of all our seedbeds. Notwithstanding these difficulties the stock looks better than that of the corresponding period last year.

With Weaver's assistance Kraebel completed the examination of the Barranca milacre plots and the final survey of deposits in the reservoir. Interested visitors to the area interrupted this work considerably but their calibre made them welcome; they included the following:

- Supervisor Cecil, of the Angeles National Forest.
- Prof. Penska, College of Forestry, Syracuse University.
- Paul Bailey, late Chief Engineer of California, now in charge of flood control for Orange County.
- H. F. Blaney, co-author of the Colorado River Silt bulletin.
- Carl Rohwer (Colorado) Agric. Engineering Division, B.P.R.
- Major Wm. Post, in charge of the cooperative survey of the Santa Ana River Watershed.
- J. A. Case and H. C. Droxell, Engineers of the Santa Ana Survey.

Mr. Rohwer will cooperate with Kraebel in devising an adaptation of the "Venturi flume" (invented by C. L. Parshall of the B.P.R.) to the measurement of silt-laden run-off from the Barranca area. Major Post has offered the aid of his technical assistants in computing last winter's run-off, complicated by the silt deposits in the weir basin.

All of the engineer visitors are working along lines closely related to our own and are directly interested in whatever results our study may yield. They were in hearty accord with a proposal to hold a conference of all water conservation research workers in southern California in the near future.

Kraebel held conferences with Dr. E. B. Copeland who is working out a technique for the study of transpiration rates of chaparral. Instruments were ordered through the Weather Bureau for two meteorological-ecological stations on the Santa Barbara Forest.

With Jesse Nelson, of Range Management, Kraebel visited the San Bernardino and Cleveland Forests in May to examine last winter's tree plantings and to observe range conditions. Erosion is at work on nearly all the mountain meadows and valleys of the South. It is doubly impressive because of the fact that all of it seems to have occurred in the comparatively short time since the advent of the white man, and most of it within the last 30 to 50 years. What were small gullies in 1900 are yawning canyons today, sometimes hundreds of feet wide. Every year hundreds of acres of deep meadow soils melt like sugar in the winter rains and are carried away to fill municipal reservoirs or build deltas in the Pacific Ocean. Most severe on the Cleveland Forest, next on the Santa Barbara, and to a lesser extent on the San Bernardino, erosion of the meadows and valleys has reached the proportions of a major problem and is accelerating at an alarming rate. Irrespective of the fact that most of the damage is on private lands, it has already reached so large a scale and its economic consequences are so great that it cannot be ignored by the Government. Something must be done soon, and the question naturally arises whether the Government has a technique ready to use or prescribe. Departmental Circular 33 very forcefully describes the evils of erosion, but its section on control is inadequate to the southern California situation. What, for example, can be done in "gullies" a hundred feet deep and two hundred feet wide, the sides of which are crumbling away at the rate of ten or twenty feet a year? Immediate attack should of course include complete fire prevention and the exclusion of grazing stock from the headwaters of such areas, but that alone will not stop the wasting process in the alluvial meadows farther down. The truth is that we have no technique for the quick control of such advanced erosion on an economic basis. It is a safe estimate that the size and cost of the dams, weirs, revetments, side-sloping and planting necessary for adequate control of such canyons would be many times the value of the land protected. It will be cheaper for individual owners to surrender the wasted lands for unpaid taxes than to attempt protection of the remnants with

costly works. Under these conditions Government action seems prescribed, cooperative action by federal, state and county governments, with the leadership in federal hands and with private owners contributing pro rata to the limit of their ability.

Cover Type Map

Wieslander, assisted by a State Ranger, spent practically all of June on the Klamath and Shasta Forests instructing three topographic survey crews from the District Office in the work of type mapping. These crews will secure the desired cover type data in connection with their regular mapping at very little extra expenditure of time.

Forest Products

After collecting a mass of data from a board by board inspection, both in rough and surfaced condition, of the several piles of dipped and undipped lumber erected last fall for the stain prevention tests in the yard of the Sugar Pine Lumber Company, Brundage spent most of the month compiling and analyzing the results in the hope of furnishing a fairly definite answer to the persistent inquiries which have been coming in with increasing pressure from all sides since the experiments were started. It is needless to inform our friends in other states that California produces the biggest and best of everything, not the least of which are the stain fungi which thrive on western yellow and sugar pine under the benign influence of our balmy but moist winters. Stains in other climes succumb more or less readily to treatment with cheap alkaline solutions but not so our lusty scions of the native *Sierra Ceratostomella* et al. Some disconcerting results bring forcibly to our attention that sound conclusions may be drawn only after a very painstaking fractional distillation, so to speak, of all the mixed up elements which influence the discoloring of lumber. As an example of one little paradox, the summary for one pile of dipped 4/4 sugar pine showed that the boards immersed in Fungimors solution for a period of 15 seconds came through with a lesser degree of stain than those immersed for four minutes. Fortunately the data were recorded in such a manner that such puzzles are susceptible of solution by correlating other factors, but it's a nerve-wracking job in the middle of the field season. Enough plotting on coordinate paper has been accomplished, however, to prove beyond any doubt that Fungimors is:

(1) An effective retardent of blue stain and various other stains as well even though it did not prove to be a preventive in these tests, and

(2) It shows considerably more promise than any other dipping compound which has ever been tried on California pines (except possibly straight mercuric chloride solution).

Further experiments on a smaller scale, but more intensively controlled, are necessary before we can give a final official verdict. All we may say at present is that the results so far obtained are decidedly promising.

Heptane

Operations on cuppage sale of Jeffrey pine oleoresin on the Lassen National Forest were resumed. The experimental work conducted last year by N. C. Tihomiroff will be continued by William D. Bedard, of the New York State College of Forestry.

Entomology

Person is now swallowed up in the bug-infested wilderness of the Modoc National Forest. No word has been received from him for inclusion in this month's report. Being more or less out of communication with the so-called civilized world, he is excused this time but by the end of next month we hope to hear that *Pinus ponderosa* in the north is making a comeback or at least holding its own against the onslaught of *D. brevicomis*.

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ROCKY MOUNTAIN FOREST EXPERIMENT STATION

May Activities

A large share of Roeser's time during this month was spent in connection with seed production and seed source tests. Pike Douglas fir, 1927, and Uncompahgre Engelmann spruce seed, 1927, was tested in the greenhouse along with that of the special local western yellow pine breeding trees and miscellaneous lots of kiln-dried Norway pine and white pine from the Minnesota Forest. The Pike Douglas fir germinated considerably above the average in past years, with lots running as high as 78%.

Near the end of the month representative lots of the seed collected last fall from the selected western yellow pine breeding trees (above-mentioned) were sown at the Monument Nursery, where better care can be given the seedling beds and where the trees can be grown faster than at the higher elevation at Fremont. Included in these lots was seed produced by artificial crossing in the local Strain A trees. Early results indicate slower germination and smaller trees in these lots than in those from naturally produced seed, and also total failure of one small lot procured by selfing one of the trees under study.

Four examinations were made of the altitudinal series of Douglas fir trees involved in the seed production study. A cold spring was responsible for a late start and no flowers were in evidence even at the lower limit of the species' range before May 1. An exceptionally severe spell of cold and foggy weather, bringing about 13" of snow at the Station between May 9 and May 16, held back the trees above 8,000 feet still longer, but at approximately this elevation, a large percentage of flowers was destroyed either by frosting or through failure to set because pollen distribution at the time was at a standstill. It is believed that the former is the real reason and that the flowers just as they emerge are much more susceptible to frost injury than after four or five days old. The Douglas fir flower crop, in general, was rather light.

An additional area in Block A of the Station Forest was roughly surveyed in order to include a stand of badly mistletoed western yellow pine which should be cut at an early date. A one-acre check plot in immature north slope Douglas fir of pole size was measured up adjoining the readily accessible plot facing the administrative area, which was cut-over last year for demonstration purposes.

The station arboretum was extended by the addition of a few each of Abies lasiocarpa from Berthoud Pass, Pinus edulis, Juniperus scopulorum and monosperma and the exotic Larix dahurica, all obtained from the Monument Nursery. Most of these were apparently doing well on July 1.

The month of May was exceptionally wet, total precipitation amounting to 5.86 inches, which is several times above normal. Conditions for the success of spring planting in the Pikes Peak region were, as a result, eminently favorable.

June Activities

Twenty-four days of the month were spent by Roeser in the Black Hills of South Dakota, where a series of brush disposal plots were established near Nemo within the Black Hills research center. The object of these plots is to study the relative inflammability of brush resulting from logging operations under four methods of disposal and through a period of ten years, and also to study the silvicultural aspect of brush disposal as it affects soil improvement and results in stimulated growth of the stand. Eighty plots were established in an overmature Site II stand, these being arranged in 8 strips (4 pairs) of 10 plots each running with the slope. Each pair of strips represents one method of brush disposal. On one of the pair the brush will receive initial treatment and no other; on the other, one plot will be burned annually for the next ten years. The details of burning have not been fully worked out.

The stand was marked and all trees were measured, those to be left being tagged. Reproduction counts were made on 32 quadrats to study the effect of burning and scattering of brush in reducing the amount of reproduction coming in after logging. The problem of reproduction in the Black Hills is quite the reverse from that in the rest of the western yellow pine type in the central Rockies.

The Benchmark and Merritt thinning plots in mature and pole western yellow pine were remeasured during this period. An examination was also made of the seed trees designated in 1926 by Bates and Roeser to solve the Nebraska Forest seed source problem in the Black Hills and Pine Ridge country of northwestern Nebraska and eastern Wyoming. An abundant seed crop is assured for 1928 in the Pine Ridge country, but in the Hills the crop will be too meagre to warrant visiting the seed trees in the fall.

At the Fremont Station progress was made in thinning the 1928 plots designated for cutting, and a third pasture area was enclosed, which will permit of a rotation scheme whereby the present poorly stocked pastures will be permitted to recover periodically from overgrazing.

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NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

Field work with 18 junior and senior forestry students from the University of Idaho occupied the entire Station staff for part of June. Dean Miller expressed satisfaction with the research training we were able to give his students, and the Station received the benefit of appreciable field work by these men. With some additional work by Marshall and two regular field assistants, the six plot installations started with student help were completed by the end of the month.

One field assistant is being obtained through a cooperative arrangement with the Spokane Office of Blister Rust Control. This man's salary is paid by the Spokane office while we furnish transportation and subsistence. He will work with Marshall's crew in re-examining our Mr. quadrats, giving first attention to Ribes growth, and assisting in the seedling counts after the Ribes have been accounted for. Such cooperation and use of permanent and temporary quadrats results in more efficient field work for both offices and insures a maximum of data obtained from the installation of the quadrats.

The examination of the screened quadrats, so far completed, indicates that the screened frames designed last year have withstood the winter's snowfall even better than expected. These frames, 3.3 feet square, consist of two types, one designed to keep disseminated seed from reaching the ground, and at the same time permitting the germination of stored seed, and the other to catch seed and retain it safe from

rodents and birds until collected and counted semi-monthly. We have 80 of the seed traps and 350 of the screened frames in use. Information concerning design and costs of these frames can be furnished.

Announcement was recently made by Dean Miller of the organization of the Idaho Forest Experiment Station at the University of Idaho. The purpose of the Station is to do for forestry in Idaho what the agricultural experiment station does for agriculture. The Station will consist of a forest research laboratory and demonstration forests. The establishment of the Station will clarify the organization responsibilities, use of funds, etc., as between instructional work and research and demonstration. All the forestry faculty members have for years given about 20 per cent of their eleven months of employment to research work. Under the new Station organization the faculty will become part-time members of the staff with dean Miller as Director. In addition, there will be two full-time research men, one in charge of the laboratory work and one in charge of the demonstration forest. There will also be a half-time research man to assist in the laboratory as well as two laboratory fellowships. Provision is made for field assistants in the summer. It is understood that the Board of Regents and interested lumbermen are underwriting the Station's budget of \$18,000 a year until the appropriation of funds by the Legislature for the next biennium. This new Station has a well-defined program of work drawn up by a committee consisting of Dean Miller, Dr. Hubert, the State Forester, and three prominent lumbermen. This program also had the consideration of our staff in a conference requested by Dean Miller for our comments and suggestions. The work is to commence this field season. The work as planned on five projects fits excellently into the regional needs without overlapping.

It is appropo to announce here the loss to our staff in the very near future of both Kempff and Marshall. Both men will leave September 1, Kempff to accept the position with the new Idaho Forest Experiment Station in charge of demonstration forest and silvicultural field work, and Marshall to go to Johns Hopkins to begin his studies for a doctorate. The loss of both men will be keenly felt by the Northern Rocky Mountain Station. We will particularly feel their going at a time when we shall have an overload of annual and periodic examinations of Mc, Mr. and ME plots this fall.

Mr. Marsh, of the Washington Office, is a visitor in the District, inspecting both Products and Station work.

R. E. McArdle visited the Priest River Branch for a two-day discussion of fire investigations with Gisborne. Personal conferences are by far the most efficient method of reaching agreements and of unifying work at different Stations. McArdle also attended a Kaniksu guard-training school while Gisborne described the information already obtained by our fire research and how it can be used to improve fire control on the Kaniksu Forest.

So far, Gisborne has been able to reach two guard-training schools, the District ranger school, the Supervisors' fire conference, and the Idaho students, with a short talk on our fire research, its objectives, progress, and the practical use of results. Three National Forests are to be visited in early July to help them better understand the new information available and the methods of using this knowledge for improved fire control. Although nearly all of our progress has been described in published reports, except the main report "Measuring Fire Danger in Northern Idaho," which was last heard from in the Washington Office over a year ago, the best method of getting our results into field practice seems to be by personal demonstration under actual conditions, working with the Forest Supervisor and his assistants. Three Forests are scheduled for such work this year, with four or five on the list for 1929.

Professor J. Nelson Spaeth, of the Cornell forestry faculty, visited the Priest River Branch station for several days in June. He was making a study of leaf surface of western white pine as compared with eastern white pine for the Office of Blister Rust Control.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

The Western Forestry and Conservation Association has just inaugurated a study of the land use problem in its economic, silvicultural, and protective phases, taking Grays Harbor County, Washington, as a critical example for intensive study. Field work is in charge of Professor J. L. Alexander of the University of Washington College of Forestry. The Experiment Station has pledged cooperation and will furnish data applicable to this particular study which can be gathered in connection with our current projects in that region.

The range finder borrowed from the Washington office has been found to be so useful in making sample plot maps that one was bought for our permanent use. The Leitz 20 cm. "Farno" type was selected, equipped with telescope.

Munger spent a few days at Wind River, partly with Isaac and partly with Simson, and then had about a week in eastern Oregon with Westveld and Meyer. His latter trip was timed to coincide with that of Mr. Ramsdell of Forest Management and Mr. Lachmund of the Bureau of Plant Industry.

Some conference was held with the Dean of Engineering and two professors from the Electrical Engineering Department of Oregon State College, at their initiation, concerning cooperation in the study of lightning storms and protection from lightning on the National Forests, but the cooperative study is not effective this year.

Douglas Fir Slash Hazard

McArdle returned to the Station after an absence of nine months at the University of Michigan. Enroute to Portland he visited Priest River to discuss forest fire research with Gisborne.

Measurements of Factors Influencing Douglas Fir Natural Reproduction

Isaac spent the greater part of the month in the upper Wind River valley getting under way the intensive study of natural reproduction. On these areas daily, and in critical weather, hourly observations will be made of air and soil temperatures, soil moisture, evaporation, light and the influence of cover and root competition. The 1928 crop of seedlings has already sustained the surprising loss of 42 per cent. The greater part of this loss occurred from heat during the hot, dry spell in the latter part of May. The losses during June have occurred from grubs, insects, or mice, a cause of seedling loss that has heretofore been given little attention. Between daily examinations a seedling may disappear entirely or be found tipped off anywhere between the surface and one inch up. In other instances the stems appear to have been eaten by grubs from below the ground surface as the crown of the seedling with only part of the stem attached may be found standing upright in a tiny hole where the seedling stood on the previous day. To date the marauders have not been apprehended.

Western Yellow Pine Growth and Yield Study

Meyer spent the full month of June in the yellow pine region and put in at least three weeks of the time on the new growth studies testing out the working plan. To get a good understanding of the problem he did a variety of things, such as taking a number of temporary plots in even-aged stands, setting out some permanent sample plots, and taking growth data in a number of uneven-aged stands which have been partially cut over. One of the areas gave an admirable example of the difference in working principles between the early marking and the present methods.

One nice patch of immature even-aged western yellow pine covering about 30 acres gave some very interesting results. Ten samples of one-half to one acre each in this 65-year-old stand showed that the total basal areas ran from 169 to 252 square feet, but chiefly from 202 up. Average diameters vary from 7.0 to 9.0 inches; numbers of trees 2 inches and larger from 388 to 875, or 160 to 203 trees 7 inches and larger. In other words, the range of apparent full stocking is much wider than has been expected and the choice, therefore, of plots in the field can be made with less discrimination.

Wind River Branch Station Activities

This month saw the wind-up of the blasting phase of the snag study. Two hundred snags were treated with explosives with gratifying results, about a hundred more have been bored for burning this fall, and by the end of the season sawing data will have been obtained on several hundred snags. The last day's shooting was "covered" by reporters, two news-reel camera men, and a number of "still" photographers, one of the news reels being released almost as soon as it was developed.

Two of the lookout fire weather stations were put into commission this month. One of them, Red Mountain, may also prove of value in connection with the new landing field now under construction at that point.

Methods of Cutting and Slash Disposal in Yellow Pine

Westveld spent most of the month completing the work on the yellow pine methods of cutting plots on the Crater Forest. Aside from this several days were spent in the Deschutes Forest in the examination of the slash disposal plots, the regional races of western yellow pine plantations, the selection of an area of timber for the yellow pine mill scale study, and the marking of an extensive methods-of-cutting plot. On the marking of the methods-of-cutting plot, Forest Management was represented by Ramsdell, the Experiment Station by Munger and Westveld, and the Forest by Lumberman Perry. Later on Ramsdell and Kircher joined Westveld on the Crater for the marking of a 50-acre methods-of-cutting plot.

The slash disposal plots on the Deschutes now show an advantage in subsequent reproduction of three to one in favor of leaving the slash over piling and burning. Mr. Lachmund of the office of Forest Pathology accompanied Westveld on the slash disposal plots to make observations on the progress of decay.

The indications are that the yellow pine seed crop will be fairly good in some localities this year, particularly so on some of the older cuttings. The percentage of trees bearing cones this year is considerably greater on the older cut-over land than on the recent cut-over lands and in the virgin forest. Furthermore, the individual trees have heavier crops on the former areas.

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OFFICE OF FOREST PRODUCTS

Washington

Wood Preservation Statistics

This report covering the Quantity of Wood Treated and Preservatives Used in the United States in 1927 was completed and sent to the cooperator, The American Wood Preservers' Association, the latter part of the month.

The industry continues to grow. The number of plants that were in active operation in 1927 was greater, more preservatives were used, and a larger amount of wood was subjected to treatment than was reported for any previous year.

Cooperation - General Supply Committee

During the early part of the month the work of making awards on the various items listed under Class 7, Lumber, Millwork, Boxes, and Building Material, General Schedule of Supplies, for the fiscal year 1928-1929 was completed. Prior to the sending out of bids this section of the schedule was thoroughly revised to eliminate all items that are not regularly purchased and to include those in steady demand that were not already listed. All items covering lumber and millwork are in strict conformity with American Lumber Standards.

Cooperation - District Government

In connection with the repair work being done on the Chain Bridge the officials of the Office of Superintendent of Bridges requested the assistance of the Forest Service in the matter of the proper kind and grade of material to use for replacing the floor. Pressure-treated material could not be used because of lack of funds and Dense Select Structural southern pine was called for. Some material has already been delivered, but upon inspection it was found to be of a lower grade, probably Structural Square Edge and Sound, not containing the 85 per cent of heartwood, girth measurement, required.

A member of the office spent a day at Occoquan, Va., where he visited the District of Columbia Penal Institution to inspect barges in order to prepare treated timber specifications for use in constructing barges. Approximately 350,000 feet board measure of structural timber will be required. The grade recommended was No. 1 Common south-

ern pine in accordance with the latest timber rule-book of the Southern Pine Association. The preservative treatment will be applied by the empty cell process, using distillate coal-tar creosote, with a final retention of 8 pounds per cubic foot, all sapwood and as much of the heartwood as possible to be impregnated with preservative.

Cooperation - Treasury Department

Mr. Helphenstine spent a day at the United States Coast Guard Station at Curtis Bay, Md., to inspect power life boats under construction. The inspection was made at the request of the Coast Guard ^{officials} to determine if possible the cause of decay noticed in similar boats in service. There was found decay inside of a series of water-tight compartments which run the length of the boat, and developed through lack of ventilation. Preservative treatment of certain parts of the boats and provision for ventilation will correct the trouble.

Specifications for Wooden and Fiber Boxes

The Shipping Container Committee of the Federal Specifications Board is divided into sub-committees, one of which has to do with wooden boxes and one with fiber boxes.

The Forest Service is represented on the Container Committee by C. A. Plaskett, Chairman of the Sub-Committee on Wooden Boxes, and T. A. Carlson (both of the Forest Products Laboratory), Chairman of the Sub-Committee on Fiber Containers; and H. S. Betts, alternate for both. The members of the Forest Service in their work of preparing specifications have received the hearty cooperation of the Chairman of the main committee.

The committees on wooden and fiber boxes have been engaged in the preparation of four specifications, i.e.:

- Wooden Boxes - Nailed and Lock-corner Construction.
- Wooden Boxes - Cleated Plywood Construction.
- Fiber Boxes - Solid.
- Fiber Boxes - Corrugated.

These four specifications were prepared by the Forest Products Laboratory and submitted to the main container committee in 1927. After some changes had been made the specifications were mimeographed and submitted to various members of the trade and to various Government departments. Numerous criticisms and suggestions were received and acted on at a second meeting of the main committee. The four specifications were then completely rewritten to conform to the form requirements of the Federal Specifications Board and are now being mimeographed for distribution a second time.

Southern White Cedar Bulletin

Mr. Brush visited several firms in southeastern Virginia to obtain new information on southern white cedar. One of the most important southern white cedar products is boat boards for small boats. This stock is flitch sawn and brings about \$100 per M for the best grade which is sound. One firm is specializing in the manufacture of ice cream packing tubs for shipping ice cream. Southern white cedar is well adapted for this use because it is light in weight, and lasts well in contact with moisture.

Farm Timber Marketing

Mr. Brush also attended the Central States Extension Foresters' Conference at Urbana, Illinois, where the subject of marketing farm timber was discussed. Several States are taking up active projects on this subject, and when the work has been sufficiently developed some scheme of cooperation with the Forest Service will be worked out. It was tentatively agreed that for the present the Forest Service will work mainly along the lines of special uses, and the State organizations will stress local markets.

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District One

The 1927 Census of Forest Products Practically Completed During Month of June

On June 21, a consignment of 154 schedules was sent in to the Bureau of Census at Washington. At that time only four concerns had not yet submitted their returns. Schedules from two of these four establishments were received prior to June 23. The two remaining schedules are expected.

To date, 624 completed census schedules have been received in this office. This total does not include the Army and Navy Department and the Stumpage Price schedules, which number 32 and 89, respectively. The above returns cover the States of Idaho and Montana. One hundred and sixty of the regular lumber and other forest products schedules cover South Idaho concerns which were canvassed by the D-4 office at Ogden. Mr. C. N. Whitney has been directly in charge of taking the census, working as a special agent of the Bureau of the Census.

Woods Waste Survey Now Under Way

Work at present is being confined to the white pine type. The survey is being made on both private and federal cut-over areas. A plot method of covering the area is employed. The plots tallied are 1/5-acre in size. To date some 600 plots have been tallied, all but 35 in the white pine type of North Idaho. Work in the western yellow pine and the larch-Douglas fir types will also be done during the year.

Mr. R. E. Marsh of the Research Office, Washington, D. C. Visits the District

Mr. R. E. Marsh, Assistant Chief of the Branch of Research, arrived in Missoula June 19. Work of both the Northern Rocky Mountain Experiment Station and the D-1 Office of Forest Products was inspected. Mr. Marsh went over with men in both offices the status of the work in progress and plans for the coming year. A trip was made to the Woods Waste Survey and Utilization project in North Idaho.

Lumber Prices and Movement

Av. Mill-Run Prices	Annual	Annual	First Q.	April	May
	1927	1928	1928	1928	1928
Idaho White Pine	\$35.86	\$30.17	\$30.20	\$30.59	\$31.25
Western Yellow Pine	25.17	24.19	26.55	24.22	24.11
Larch-Fir	18.19	16.38	17.60	17.77	18.11
White Fir	17.41	16.80	17.89	18.57	17.16
Spruce	23.39	25.67	24.35	23.70	23.16

<u>Shipment and Cut</u>	<u>May, 1927</u>	<u>May, 1928</u>
Shipments	136,789	100,180
Cut	150,354	97,879

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District Six

Air-Seasoning Study

During the first week of June the air-seasoning study referred to in last month's report was started by Mr. Johnson at Mill B of the Weyerhaeuser Timber Company, Everett, Washington. The study includes four yard

piles, about 100,000 board feet of 1x12"-16' No. 1 and No. 2 Douglas fir Common. Although it was planned to use only No. 1 Common stock, some No. 2 Common was included to secure information relative to the behavior of encased knots. All four piles were box-piled; two were self-stuck and two piled with 1x4"-16' special stickers. In the case of both methods of sticking one pile includes 3-inch spacing between boards in a layer and one 4-inch spacing. Each of the four piles contains 35 whole-board samples and six 16-inch current drying rate samples. It is planned to take the piles down when they reach about 18 per cent moisture content, probably the fore part of August.

Little-Used Species

Mr. Johnson has practically completed the first draft of the report dealing with the utilization of bigleaf maple. This is the second of the hardwoods native to the Pacific Northwest which have been studied in considerable detail; it is planned to make similar studies of Oregon white oak and western ash some time in the more distant future. The report shows that Oregon and Washington consumed 6,241,000 board feet of bigleaf maple in 1927, of which 2,955,500 feet was consumed by the furniture industry and 2,903,000 by the chair industry.

Census

All of the 2,016 lumber, lath, shingle, cooperage and veneer companies listed have been taken care of. A total of 1,473 schedules have been sent to Washington; 8 are now ready for transmittal. As soon as the latter have been forwarded to Washington the 1927 Census work will be completed.

General Wood-Waste Survey in the Douglas Fir Region

Mr. Hodgson completed the compilation and tabulation of results of the field work and has finished writing and assembling the report. The report as prepared, consisting of 20,000 words, 45 tabulations and 2 maps, is in preliminary form and ready for the local reviewing officers.

Sawmill and Woods Utilization Study

In order to get first-hand knowledge of logging methods and practices of the different logging operations in the pine region of eastern Oregon, preliminary to the drafting of a working plan for the Shevlin-Hixon mill and woods utilization study, Mr. Spelman spent the bulk of June in the field. Seven different operations, in four different regions, were visited by him.

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WASHINGTON ECONOMICS

Lumber Census

The receipt, examination, and transmission of forest products schedules from the West proceeded normally. With the aid of the schedules already received the Census was able to issue the usual annual statement of production as indicated by a comparison of 666 identical mills. The statement for 1927 indicated that the cut would probably be 2 per cent less than in 1926.

Lumber Distribution

During June a thorough overhaul was made of the standard tabulations prepared in 1920, 1922, 1923, 1924, and 1926. Some of the tables were rewritten, and all of them have been retyped within the past few months for insertion in the "Brain Book." This gives us a complete comparable record for all of the years.

In March, 1928, the Bureau of the Census issued a revised estimate of the population of the States for each year from 1920 to 1928. The alteration of these figures destroyed the usefulness of all per capita consumption figures which have been made up within that period. We therefore reworked all per capita consumption figures as follows:

The national lumber consumption for all decades, the national consumption of paper, and the consumption of lumber by States and regions as derived from the distribution record.

At the same time new consumption tables were compiled, one for each of the years in which the distribution study has been carried. New estimates were also made of the distribution of imported lumber into the States, so that we now have for all years possible a comparable series of per capita consumption figures, including imports.

We have now sufficient record so that definite trends of per capita consumption may be observed in the different States and regions. Per capita consumption in the East, as for instance New England, is traveling along at about 300 board feet with very little variation. There is a slight tendency to decline. The per capita figures increase westerly. In Idaho and Montana they are apparently coming down a steep descent. California also is noticeably declining following the peak of 1923 and 1924. Washington is apparently near the top of a huge peak, and Oregon is climbing to a peak which may exceed that of Washington. Per capita consumption figures for several States, notably New York, Pennsylvania, Montana, and Oregon, were printed in Colonel Greeley's bulletin "Some Public and Economic Aspects of the Lumber Industry," and

these figures plot very nicely with the more modern record. At first thought one might believe that a wave of high per capita consumption of sawed lumber had proceeded across the country from east to west, but such is probably not the case. A test of some figures in the East fails to show at any time per capita running much higher than 500 feet. It seems probable that relative cheapness with which lumber is produced by modern machinery in the West has something to do with the high rate of consumption. Also it is probably true that in the regions which were lumbered first at an early date a very large proportion of the wood used was in round or hewed form rather than sawed.

Canadian Cooperation

A letter has been received from the Dominion Statistician indicating that active steps are being taken toward preparation for cooperation with the Forest Service in regard to lumber distribution for 1928. With characteristic British thoroughness they have been preparing the ground by securing the opinions and wishes of influential lumbermen and political and commercial officials. Warning is being given in Canadian forestry journals of the proposed action by the Bureau of Statistics in order that operators may be prepared to fill the blanks. Cooperation will be sought from the Canadian lumbermen's associations and the officials of various forested Provinces.

If this project comes through in a satisfactory manner, we hope to have very much better indications of the distribution of imported lumber to States than have before been available. A new U. S. questionnaire has been prepared consisting of a letter-sized sheet printed on both sides.

Log and Stumpage Prices

In this project nearly 25,000 schedules were mailed to the Census mailing list and others this year. At the end of June 3,200 schedules had been returned to this office. This seems a small proportion, but it should be remembered that a large percentage of timber operators may have carried on no transactions in logs or timber, consequently did not reply.

Of the number received 1,500 were found to be desirable and usable with more or less editing and revision. About 600 letters have been written during the year as a follow-up, returning schedules and asking the entry of specific items which had been omitted by timber purchasers. This follow-up correspondence, although it seems disproportionately heavy, almost invariably brings back a courteous letter and a complete and usable questionnaire. Considering the number of species which may be mentioned,

a single questionnaire may bring in from 1 to 12 transaction items which appear as separate cards for the Hollerith computing machine. About one-half of the usable schedules have been edited and coded.

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FOREST TAXATION INQUIRY

A conference was held on June 19 at Concord in regard to plans for work in New Hampshire. It was attended by the State Forester, members of the State Tax Commission and of the special Tax Commission, and by several representatives of the Inquiry. The situation with respect to material available for study, and opportunity for cooperation, was discussed. Following this conference, tentative plans previously formulated were revised to fit the conditions. Murphy, assisted for about one month by Hammar, will be in charge of the work of the Inquiry.

Pingree began field work in the latter part of the month. He is cooperating with a graduate student in Economics who is making a special study of forest taxation in Connecticut. They will spend about three weeks in studying conditions in two or three Connecticut towns.

A tentative plan for the work in Oregon was prepared, and it was decided to begin field work there about July 15. Fairchild will be at Portland around that date, and will make headquarters at the offices of the Pacific Northwest Forest Experiment Station.

Hall and Herbert have both left for the field and will join Fairchild at Portland. Hall spent the last week of the month in Washington. Herbert will make a stop in Minnesota enroute to Oregon.

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RANGE RESEARCH

WASHINGTON OFFICE

Chapline in Charge of Branch

A considerable part of the month was given over by Chapline to acting in charge of the Branch while Messrs. Clapp, Marsh, and Betts were at the Madison conference and Mr. Munns was also in the field. Needless to say little time was available for range research effort. It was, however, a highly worthwhile experience and aided in giving a better insight into the work of the whole Branch.

Junior Range Examiner Appointments

Of the 11 men who passed the examination this year, two were non-competitive, one a supervisor and the other a ranger, and of the others all with the possible exception of one have been offered appointment. The latter eligible is now an assistant supervisor in the Indian Forest Service. Acceptances show that three go to District 4 and one each to Districts 3, 5, and 6, besides Hatch at the Appalachian Forest Experiment Station.

Visitors

Mr. Arthur Ringland, Executive Secretary of the Conference on Outdoor Recreation, stated that Barrington Moore the editor in chief of Ecology was planning to make a trip throughout the West this year and has offered to make a study of the question of redesignation of the Nevada national forests as grazing reserves. He has requested suggestions on this from Chapline.

Director Cecil W. Creel of the Agricultural Extension Service of the University of Nevada came by the office and discussed particularly the question of the redesignation of the national forests of Nevada.

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FORAGE INVESTIGATIONS

Conferences With Dr. Coville Over General Browse Bulletin Concluded

The long series of conferences with Dr. Coville over the general bulletin on browse were finished. As a member of the board of review for this bulletin Dr. Coville confined his attention largely to the nom-

enclature, chiefly the common names, but gave a number of other valuable suggestions as well. We are very grateful to Dr. Coville for the invaluable aid he has given in improving the nomenclature of this manuscript.

Dr. Marsh's locoweed bulletin

During the month Dayton and Chapline reviewed Dr. C. Dwight Marsh's revision of Farmers' Bulletin 1054, "The Loco-weed Disease."

Smithsonian Article on Western Range Flora

During the month Dayton had conferences with Dr. Maxon of the Smithsonian Institution and Dr. Coville of the Bureau of Plant Industry relative to a chapter, to be written by Dr. Coville and Dayton, on the range flora of the West and which is to appear in a prospective volume of the Smithsonian on the general subject of botany.

Routine Plant Work

Fourteen plant collections, representing 949 specimens, were sent to the Bureau of Plant Industry during the month for formal determination. 261 plants were mounted. A number of the late Dr. E. L. Greene's "new species" of the genera Aconitum and Mertensia, based on National Forest range plant specimens, were discovered in the undistributed files of the U. S. National Herbarium, and have been checked, identified, reported on ^{to} the field, and photographed for Washington office records.

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GREAT BASIN EXPERIMENT STATION

Field work during June consisted mainly of securing plant development records at different elevations, continuation of measurements of run-off and erosion from melting snow at high altitudes and the start of the fifth season on the plant vigor clipping study.

Clarence Averill, third year forestry student at the University of Montana, assistant for the coming field season, reported for duty.

Nelson returned from his detail to Washington on May 17 where he completed the preliminary draft of his report on the Management of Black Grama Grass Range.

Visitors

Dr. John T. Faris, author of "Seeing the Far West" and other books on travel, accompanied by Supervisor Shepard of the Wasatch Forest, visited the Station June 25 and 26. Dr. Faris is very much interested in Forest Service activities and accomplishments. He is visiting various parts of Utah gathering information for another book on the West.

Vicissitudes of Temperature

This spring has been unusual with respect to ups and downs of temperature. The mean temperature for March was considerably above normal and that for April was below. May also was warmer than average while June has been much cooler than ordinarily might be expected.

Effect of Late Frosts on Vegetation

Damage to the growing vegetation by frosts occurred on June 17. At the headquarters station on the night of June 17 the temperature dropped to 26°. The day previous had been cloudy with lowering temperatures and a small amount of rain, sleet and snow fell during the night of the 16th. White frost covered the vegetation the morning of the 17th.

Observations made on the vegetation in the morning showed plants of the following species in a wilted condition:

Bromus polyanthus, Dactylis glomerata, Stipa columbiana, Rudbeckia occidentalis, Vicia americana, Geranium viscosissimum, Sambucus sp., Populus aurea and Quercus gambellii.

The morning of the 18th warmed up gradually and consequently most of the wilted plants regained their normal condition.

Plants of Agropyron violaceum, Stipa lettermanii and Symphoricarpos oreophilus were not as seriously frosted as plants of these other species.

Another examination a few days later showed that in spite of the wilting down by frost the plants at the headquarters station were not damaged to any appreciable extent. A few leaves of Rudbeckia occidentalis and Sambucus sp. plants were slightly frosted but the injury was negligible. At the higher elevations where the temperature dropped to 22, plants of the above species were more badly frozen. However, no serious injury was done to most of the grasses and weeds but Rudbeckia and Sambucus failed to recover completely and a large per cent of the leaves were completely withered.

In the oak zone where the temperature dropped to 27° the oaks were the only plants injured; the leaves of the plants at the higher elevations in the zone, particularly the younger leaves, were killed while portions of the older ones were only slightly injured. The weeds were practically through blooming and apparently were sufficiently far enough along not to be injured. In several instances it was noted that the young oak fruit had been killed by the frost.

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DISTRICT 6

Grazing Management of Cutover Land

The spring vegetative check of the Columbia Mt. Camp 9 transect was made early in June, prior to grazing use. While the data has not yet been compiled there appears to be a decrease in density of vegetation over last year of from 5 to 10% on both protected and grazed plots, due mainly to decrease in fireweed.

The proportionate density of bracken has increased with a slight increase on the majority of the plots in perennial unpalatable shrubs, such as Salal, Oregon grape, etc. Where sheep bedding conditions prevailed last year moderate increase of grass species is found. Much of this grass, however, is of inferior species such as Deschampsia elongata, Bromus tectorum and Bromus hordeaceus. A marked increase in sheep sorrel also is noted, indicating an impoverished condition or increased soil acidity. These indicators all tend toward the conclusion that the productive grazing value of cutover lands, unseeded to grass, rapidly declines after 6 to 8 years.

Dr. W. W. Eggleston, botanist of the Bureau of Plant Industry, in charge of poisonous plant investigations, was a visitor. Dr. Eggleston, who is particularly interested in Zygadenus and Lupinus species, visited the Colville, Whitman, Ochoco, and passed through the Deschutes and Cascade Forests enroute to the Santiam. From there he left for California points.

We were able to help him secure some interesting specimens of Zygadenus and Lupinus on the Ochoco. Dr. Eggleston, referring to the different poisonous properties of the several species of Zygadenus, mentioned in Bulletins 1012 and 1276, stated that the actual toxicity of the different species, as well as their nomenclature, was still in some doubt and he urged the necessity for further study and experimentation on these important points.

After looking over the material on file in the D-6 herbarium Dr. Eggleston decided that we have Z. venenosus on file, referring that material to Z. gramineus. He is inclined to think that (except west of the Cascades) Z. venenosus is comparatively rare on our D-6 National Forest ranges and that Z. gramineus and perhaps Z. speciosus of Eastwood are more common than are generally supposed. Since Z. gramineus is probably the most toxic of the group it may explain why we frequently have losses although comparatively few Death Camas are to be found.

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JORNADA RANGE RESERVE

Range Conditions and Precipitation

No precipitation occurred, so the range is quite dry. A fire two miles from headquarters burned over about five acres of summer range. Fortunately, it was found soon enough to prevent its spread to winter range which is still the principal feed for stock on the Reserve.

Condition of Stock

Stock are in good condition, considering the dryness of the range. The breeding season will soon be started.

340 calves were branded and vaccinated. The little fellows are in good shape, even though the dry range is hard on the mothers.

Investigative Work

All available time was spent on the collection of utilization data for the grazing year 1928. The utilization report will be completed by July 1. Utilization figures this year are somewhat higher than they were for last year. One explanation is that the forage crop for the 1927 growing season was from 15 to 25 per cent lower than that of 1926. Moreover, a slightly larger number of stock was carried this year.

Spring Forage Crop

The Reserve was favored with approximately two inches of precipitation during May. This rain was too late to start the spring weeds but the perennial grasses did green up for a while. As a whole, the spring has been quite dry and very few pastures are credited with any spring forage crop. Ordinarily, the spring forage crop on the Jornada is considered only in terms of weeds, but this year the little spring rain did not produce weeds.

In most pastures all spring growth is being recorded as spring forage crop.

About 15 per cent of the Yucca plants bloomed this year. The blooms are quite palatable to cattle.

Personnel

Gordon Merrick, a Junior at the University of Chicago, reported to the Jornada on June 20 for three months' work as temporary summer assistant. His forestry experience is confined to the woods of northern Michigan, so he has many surprises in store for him on the semi-desert grazing land of the Jornada. Merrick has an enviable scholastic record, and it is hoped that he will be interested sufficiently by the work this summer to continue in the Service.

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SANTA RITA RANGE RESERVE

Handling Stock

Cattle on the Santa Rita range are from fair to excellent in condition. Ruelas' cattle, according to his own statement, are in better condition than they have been, at this season of the year, for a good many years. The cattle formerly belonging to Nicholson and just recently purchased by Parker are in fair to good condition. Water shortage on Parker's newly acquired holdings is largely responsible for this condition. Parker's original herd as well as Proctor's cattle are in good to excellent condition.

Cattle on outside ranges are generally in fair condition with only a few outfits reporting good. In some instances cattle are having to be shipped out to other pasture or fed, due to shortage of feed and water.

Water Development

The water situation is more serious than at any time since the Reserve has been under Forest Service management. The main wells on Parker's new range are failing rapidly, bringing about a condition that has necessitated some minor adjustments in some of the pastures in order to keep all the cattle supplied with water. With summer rains coming shortly it is not expected that more than additional minor adjustments will be required to bring the cattle through in fair condition.

On Ruelas' range, while no water shortage has been experienced, it has been necessary to put down an additional 50 feet of pipe in the mine shaft which furnishes his water supply. When this same shaft was being worked, about 10 years ago, it required a four-inch pump to keep the water level down and at no time since then has there been the slightest indication of a falling off in the supply until the present spring.

A brief study of the rainfall records at Florida Station, for the past 27 years, indicates that there was only one other year that even approached the present spring in dryness: that was the year 1905 when .92 inches of rainfall was recorded between March 1 and June 30. The spring of 1928 (just ending) shows a total precipitation of .67 inches between February 15 and June 30 or approximately 2.25 inches below the past 27-year average. This low rainfall together with a comparatively small snowfall during the past winter are the chief factors in the water shortage; however, added to these has been an unusual amount of wind throughout the entire spring season instead of being confined to the months of March and April. During the last days of June a severe wind storm hit the headquarters station and blew down several large trees besides breaking off a great many branches. Quite a number of large oak trees in the vicinity of the Station are dying as a result of drouth conditions.

Poisonous Plants

There has recently been expressed, by stockmen, considerable concern over the tremendous increase of burro weed (Aplopappus) over large areas in the southern part of the State. Most of the spread has occurred during the last two years and some idea of its magnitude may be gained from the following figures secured on the reserve during the summer and fall of 1927:- On one range that has been properly grazed for the past seven years with largely deferred summer use, there were counted 1700 old established plants of burro weed and 27,000 new seedlings per acre. Practically all of these seedlings have come in during the last two years. On another range where grazing has been proper for the past two years following one year of protection, there were counted 2300 old established plants and 55,000 seedlings per acre. Just what percentage of these seedlings actually survive and grow into mature plants will be watched with interest.

Much remains to be learned about the growth habits and requirements of this plant and it is hoped that a comprehensive study can be undertaken within the next few years. Just at present, unusually favorable climatic conditions would seem to be the most important factor in its sudden increase.

Miscellaneous

On June 6 Culley returned from a four months detail in the Washington office and feels that no similar amount of time could possibly have been spent to better advantage anywhere. The opportunities afforded by such a detail are such that every field man in Research work cannot fail to profit in ways far too numerous to mention. Culley expresses the hope that he will have another opportunity to renew the many very pleasant associations that he states he made on his recent trip.

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